

## Systems & Models

### 1.1.1 Outline the concept and characteristics of systems

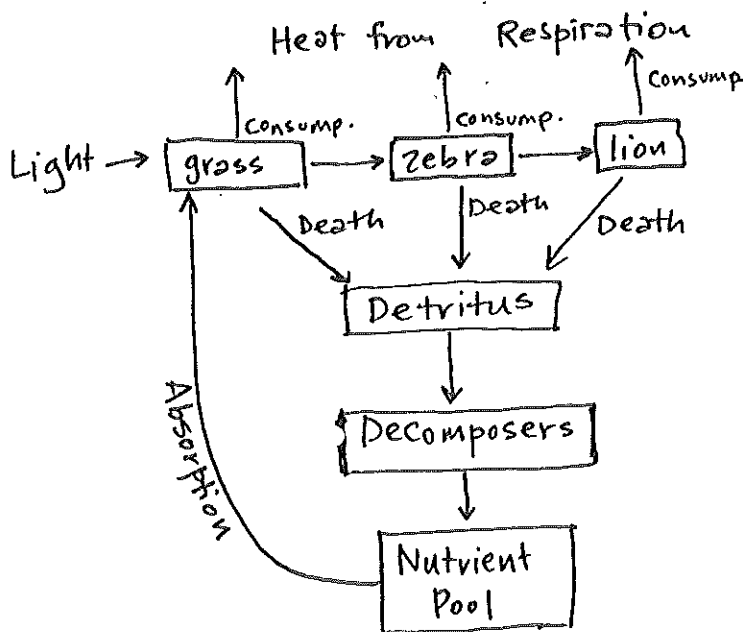
- ↳ A system is made of sets of components that work together & form integrated units → together form a functioning whole.
- ↳ Focus on Relationships & Linkages →
- ↳ Can be very large (universe) or very small (cell)
- ↳ living or nonliving (cell phone), abstract (social norms) OR things like economic or legal systems

### How Do You Diagram a System?

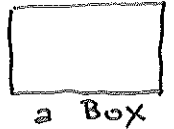
Systems more than the sum of all the parts → A watch is more than glass & gears.

• For example ...

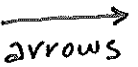
• Food Chain is a system:



\* Storages of matter & energy =



\* Flows (movement in a system) =



\* Inputs (into storage) =



\* Outputs (out of storage) =



\* Boundaries of a system = a solid line

\* processes are ALWAYS labeled!

### 1.1.3 Define the terms open systems, closed systems, and isolated systems

#### Open system

exchange matter & Energy w/ Environment

- \* Most systems!
- All ecosystems

#### Closed systems

exchanges matter BUT NOT energy with its environment

\* VERY RARE!

\* Earth as a whole is almost closed (only natural one)

example - sealed aquarium or terrarium Biosphere 2

All N, P, C, O, H<sub>2</sub>O cycle around BUT Light comes in from outside & system & Some Returns to space.

#### Isolated System

exchanges nothing with its environment

Doesn't exist naturally BUT entire universe is an isolated system.